

Appendix E.9: Subsidence (Land Loss)

Subsidence hazard vulnerability was assessed for the population and general building stock (residential, industrial, commercial and governmental; and educational, agricultural and religious occupancies were grouped together as "other" since there were fewer buildings in these occupancy classes). Projected land loss data, provided by the USGS, U.S. Census 2000 and HAZUS-MH general building stock data were used to identify subsidence hazard vulnerability in Louisiana coastal parishes. The USGS land loss data portrays the projected average rate loss from 2000 to 2050 for four areas in coastal Louisiana; the four areas have different individual loss rates as shown in Map E-15.

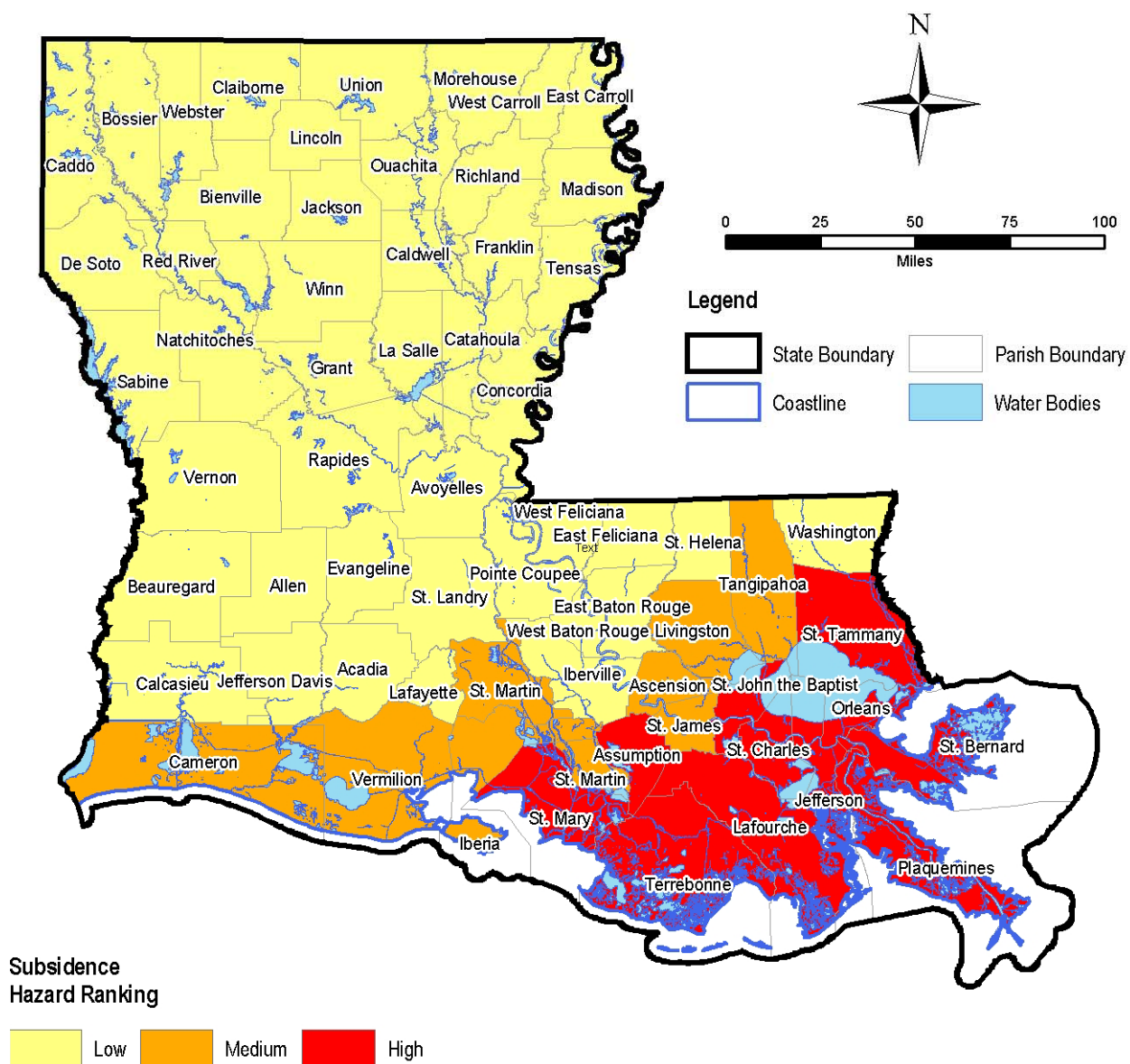
Hazard Ranking

The four land loss rates did not play a role in the vulnerability analysis, but were taken into consideration in creating the hazard ranking. The subsidence hazard ranking was developed by weighting the building exposure values by the absolute value of the USGS land loss rates. The value inside each area is the projected rate of loss expressed in the anticipated average number of square miles that will be lost per year between 2000 and 2050. The land loss rates (–0.7, –1.2, –3.7 and –4.6) were converted to absolute values. This weighting was performed to account for areas with higher vulnerability to subsidence (i.e., the area with a –4.6 rate is more vulnerable than the area with a –0.7 rate). The results are provided in Table E-36 and Map E-15.

Table E-36. Parish Ranking for Subsidence Hazard

Rank	Parish
1	Jefferson
2	Orleans
3	Terrebonne
4	Lafourche
5	Saint Tammany
6	Saint Charles
7	Saint Mary
8	Plaquemines
9	Saint Bernard
10	Assumption
11	Saint John the Baptist
12	Saint James
13	Livingston
14	Tangipahoa
15	Ascension
16	Saint Martin
17	Cameron
18	Iberia
19	Vermilion
20	Calcasieu

Map E-15: Subsidence Hazard Ranking



Methodology

The HAZUS-MH inventory was developed as follows:

The HAZUS-MH general building stock data provides the building valuation for each specific occupancy classification (e.g., single family residential, retail trade) developed from the U.S. Census and Dun & Bradstreet. The general building stock data set includes the residential, commercial, industrial, governmental, educational, agricultural and religious buildings for each parish. This data was developed at the census block level and then aggregated at census block level. This data set is from the 2000 version of TIGER/Line files and first quarter of 2002 data from D&B. The dataset was developed by applying RS Means replacement values for typical building floor areas and construction for each specific occupancy, which is a nationally accepted reference on building construction costs and is published annually.

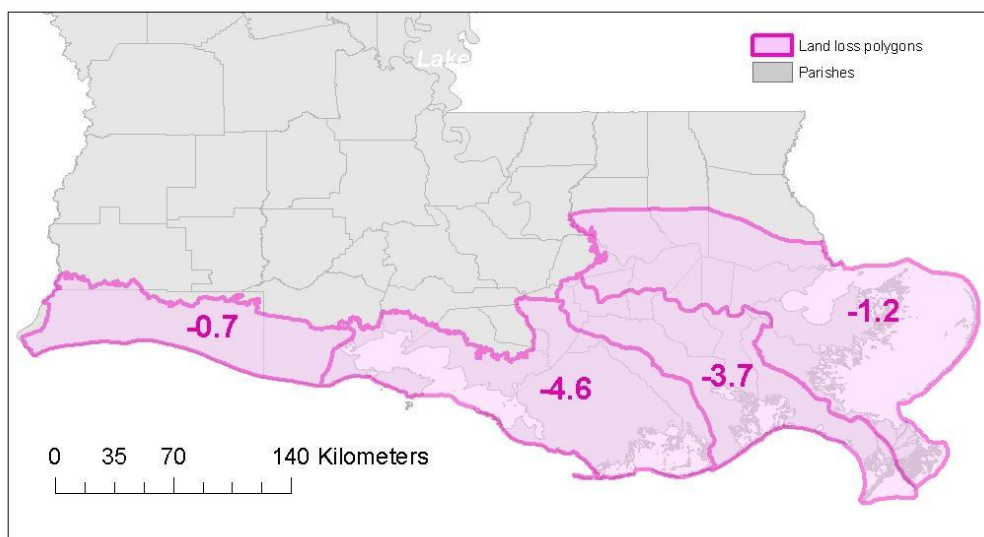
Population exposure was used to determine vulnerability. The analysis for population exposure used U.S. Census 2000 data and the USGS land loss data. Exposure was based on the location of the population inside the 20 parishes that were identified as being susceptible to subsidence. U.S. Census block data was overlaid with the USGS land loss data to determine the population count.

General building stock exposure was used to determine vulnerability for the 20 vulnerable parishes. Building value exposure was based on identifying the value of the buildings located in the four areas shown on Map E-15. Building value data was aggregated by census tract. This data was overlaid with the USGS land loss data to determine the general building stock exposure of each building type (e.g., residential, commercial) in each of the four areas. The exposure values were summed for each building type by parish, as well as the total exposure for each parish.

Loss estimates could not be provided since historical loss information was not available, nor was the level of detail in the USGS land loss data appropriate. The USGS land loss data depicts the projected average rate of loss for widely generalized areas and does not specify rates of land subsidence for specific sites..

The land loss data set is a highly generalized polygon map, without site-specific reliable information. Therefore, it is assumed that the projected loss of land occurs at the same rate throughout the area inside each of the four separate areas identified on Map E-16. Expected land loss data from the USGS and default building stock data from the Hazus-MH inventory was used to estimate potential exposure to subsidence in Louisiana coastal parishes. The USGS land loss data is a shape file polygon file.

Map E-16: Land Loss Areas in Southern Louisiana, Projected Annual Loss in Square Miles



As shown in Map E-15, the USGS has divided the area into 4 polygons. Each polygon covers more than one complete or partial parish. The value associated with each polygon is the projected annual land loss, in square miles, from the year 2000 to 2050.

Results

The results for population and general building stock exposure to subsidence are reported in Table E-37.

Table E-37. Population and General Building Stock Exposure to Subsidence for Louisiana Parishes

Parish	Subsidence Exposure (\$1,000)						Total
	Population	Residential	Commercial	Industrial	Governmental	Other	
Ascension	10248	395,948	25,460	11,088	229	3,464	436,189
Assumption	20434	788,653	43,167	14,188	1,518	15,501	863,027
Calcasieu	315	16,390	160	0	0	549	17,099
Cameron	7775	400,051	51,487	19,728	3,027	14,168	488,461
Iberia	634	31,480	10,490	27,735	0	1,079	70,784
Jefferson	455466	22,567,396	3,638,595	558,793	42,131	245,369	27,052,284
Lafourche	89974	3,919,901	418,333	57,758	12,733	60,074	4,468,799
Livingston	31634	1,284,210	43,271	7,734	345	12,448	1,348,008
Orleans	484674	23,701,447	3,285,726	365,626	80,413	289,521	27,722,733
Plaquemines	26757	1,032,634	102,382	38,206	2,544	18,738	1,194,504
Saint Bernard	67229	3,117,667	252,534	48,388	5,089	23,250	3,446,928
Saint Charles	48072	2,244,717	159,074	71,157	11,935	31,020	2,517,903
Saint James	21216	816,792	57,533	3,292	1,886	7,183	886,686
Saint John the Baptist	43044	1,918,440	166,915	29,466	4,491	25,359	2,144,671
Saint Martin	1463	80,427	117	0	0	0	80,544
Saint Mary	18838	834,590	179,789	55,091	2,830	11,403	1,083,703
Saint Tammany	120752	6,900,725	715,882	69,535	10,044	73,074	7,769,260

Appendix E - Statewide Risk Assessment (continued)

Table E-37 (continued)

Parish	Subsidence Exposure (\$1,000)						Total
	Population	Residential	Commercial	Industrial	Governmental	Other	
Tangipahoa	25757	1,073,579	73,230	11,929	1,252	15,232	1,175,222
Terrebonne	104503	4,510,212	600,870	184,043	12,481	89,114	5,396,720
Vermilion	1670	118,393	15,477	4,657	156	1,925	140,608
Total	1,580,455	75,753,652	9,840,492	1,578,414	193,104	938,471	88,304,133

Data Limitations

The USGS data does not contain site-specific subsidence rates at the tract or block level. The data only shows very large areas with varying loss rates. Without knowing specifically where losses are more likely to occur, the types and amounts of expected loss (e.g., more loss would be expected to occur in more densely populated areas) cannot be estimated.

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